



# THE PROVIDENCE DIGITAL RIVERS PROJECT

JORGE  
**ELORZA**  
*for* MAYOR

ONE PROVIDENCE



# **The Providence Digital Rivers Project**

## **Innovation for the present, infrastructure for the future**

### **Page 3: The proposal**

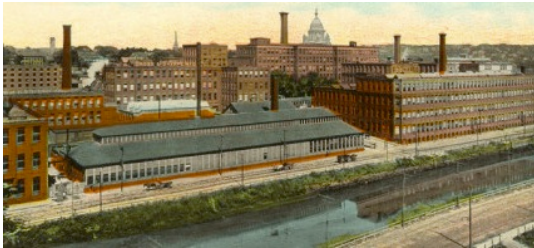
My full, in-depth proposal for the creation of a citywide broadband fiber optic network

### **Page 10: The explainer**

A Q&A-style, layman's terms breakdown of what I'm proposing and how I plan to achieve it

## Introduction

During the great boom that followed the Industrial Revolution, Providence flourished as a center of business and innovation. This was due in part because the city provided the economic engines of that era – the factories – with close proximity and ready access to the power source that drove their business: the



rivers. We are now in the wake of another economic revolution – the Knowledge Revolution – and for Providence to once again be a thriving hub of industry, it must provide close proximity and ready access to the power source of knowledge businesses: high-speed information networks.

World-class cities thrive and innovate with world-class technology and information networks. Providence already boasts some of the world's finest universities, cutting edge medical institutions, and an increasingly thriving tech and entrepreneurship community. Now we need a citywide broadband network that will allow us to stay ahead of the curve. I am calling this, in tribute to the waters that powered Providence's first great economic boom, the Providence Digital Rivers Project. This will be a fiber optic network capable of delivering gigabit internet speed, which is approximately 100 times faster than most current internet speeds. (For reference, gigabit speed allows for download of an entire HD feature-length movie in approximately 30 seconds to a minute.)

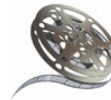
### HOW FAST IS GIGABIT INTERNET SPEED?



DOWNLOAD 25 SONGS =  
1 SECOND\*



DOWNLOAD AN  
ENTIRE TV SHOW =  
3 SECONDS\*



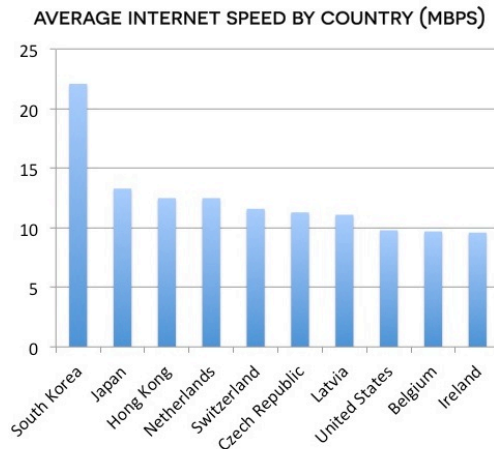
DOWNLOAD A  
FEATURE LENGTH HD  
MOVIE =  
36 SECONDS\*

\* FIGURES ACCORDING TO AT&T

## The Challenges

Unfortunately, our reliance on private internet service providers (ISPs) like the cable companies is hindering the speed and accessibility of the web. The lack of competition has allowed them to hold back the top speeds of their service and avoid upgrading their infrastructure, resulting in higher prices for slower and lower quality service than the market can bear. The large ISPs are fighting net neutrality, which forces them to make their bandwidth accessible to all internet traffic equally, in favor of deregulation that would allow them to deliberately slow access to in-demand services (like Netflix and YouTube) in order to extract fees from them. Furthermore, the ISPs refuse to upgrade their capacity, or even use the full capacity currently available to them, to create an artificial scarcity in the market, allowing them to keep prices (and profits) high. Tech writer David Auerbach points out on Slate.com ("Yes, Your Internet is Getting Slower," 05/14/14) that "these ISPs are intentionally letting their service degrade because they're cheap, like a city not fixing potholes in its roads." As the FCC continues

to show willingness to let cable giants like Time Warner and Comcast merge, there will only be less incentive for them to offer better service.



SOURCE: AKAMAI TECHNOLOGIES 2013 "STATE OF THE INTERNET" REPORT

Many cities have started to push back against the ISPs by establishing municipal fiber optic networks capable of delivering gigabit speeds. These networks serve as the competition currently missing from the market in many regions that are often dominated by one or two cable companies. Municipal fiber networks are not like municipal wi-fi, which offered the promise of free internet for all, but failed to deliver on that basic premise, and quickly fell behind the technological curve. Municipal fiber is not free internet for all, but rather a competitor to private ISPs, one capable of delivering faster speeds to most customers at comparable prices, and ultra-high speeds beyond what the cable companies can provide to top level business customers, universities, and other large institutions.

The benefits of this go far beyond faster download speeds. For the consumer, there is a twofold economic benefit. First, municipal fiber networks have been shown to deliver prices comparable to the existing ISPs, but with faster speeds. Second, other cities with municipal fiber have seen cable companies and similar ISPs either upgrade their service or lower their prices (or both) in response to the competition. For example, Kansas City recently gained a citywide fiber optic network courtesy of Google's Google Fiber project, which offered customers a one-gigabit connection for approximately the same rate other ISPs were already charging for slower service. Google Fiber launched in November 2013, and by December, Time Warner Cable began boosting the speed of its own service. Later, when it was announced that Google Fiber would expand into Austin, TX, AT&T quickly announced plans to offer its own gigabit service in that city, and Time Warner offered to include free wi-fi in public areas to existing customers.

### The Benefits

Gigabit fiber optic networks expand the capabilities and possibilities of the internet in ways that greatly benefit innovation, quality of life, and economic development. The best example of this is Chattanooga, TN, dubbed "Gig City" because of its ambitious municipal fiber optic project. Chattanooga's publicly owned electric utility, EPB, undertook the construction of the network as part of a simultaneous upgrade of its system to a fiber optic smartgrid. Chattanooga is a city that often suffers violent thunderstorms and the power outages that follow. The new smartgrid both reduced the number of outages by 40% and increased the overall efficiency of the system, saving money.



The fast internet that came with the smartgrid has been a boon to Chattanooga's economy. It has made the city a more appealing home for innovative tech companies and startups, and it has quickly gained a reputation as one of the Southern hubs of the Knowledge Economy. Both Volkswagen and Amazon.com located new facilities in Chattanooga. GigTank, a startup accelerator that boasts of being the only one "connected to a metro-wide fiber optic network," launched an initiative to get tech startups to move to the city for the chance to win a \$100,000 grant.

The capabilities inherent in a gigabit network also foster innovation among the private sector and large institutions, as they are able to develop apps that can only function with ultra high speed internet. For example, a group of Chattanooga radiologists developed its own app to allow doctors to view digitized scans anywhere, anytime. And the city is only just beginning to discover the possibilities that come with citywide gigabit. "Our fiber network is like having the first city that discovered fire," said former Chattanooga Mayor Ron Littlefield.

Many of the benefits of Chattanooga's Gig City project would be applicable to Providence: enhanced capability for the medical and tech sectors; better disaster recovery and emergency management capacity in a region that frequently experiences severe weather; and greater access to digital learning tools and cloud-based services for innovative education institutions.



The possibilities presented by this level of speed and connectivity are limited only by the imagination, and their true applications have only just started to be realized. Imagine doctors at Brown's Alpert Medical School able to teach classes all over the world through high quality video conferencing; Rhode Island Hospital able to perform remote diagnostics; RIEMA, first responders, and utilities able to coordinate sophisticated disaster relief efforts without losing critical online infrastructure; the universities able to collaborate in high level research and learning through Internet2; K-12 schools able to innovate their curriculum through cloud-based learning; libraries able to provide more internet-based services to more people because of increased speeds; a startup community able to leverage broadband connectivity to grow and scale up more quickly; local businesses with greater capacity to connect to a complex global economy.

Providence missed the tech and biotech booms of the past that elevated Boston as a center of innovation; we simply cannot afford to miss the next wave. Our city can already compete with the Boston-Cambridge nexus on both cost of living and quality of life, and Providence's proximity to both Boston and New York makes it geographically appealing as a center of innovation. Furthermore, Providence's small size means it is a highly networked city, where the accessibility of talent, mentorship, capital, and other crucial resources for startups and small businesses puts it at a competitive advantage with much larger cities. Now we must provide the critical innovation infrastructure to bring it all together and help Providence take its rightful place as one of the centers of the Knowledge Economy in the northeast.

### **The Cost (Always, the Cost)**

Setting up this kind of network in Providence would obviously require significant investments in terms of both funding and infrastructure, but there are a number of cities that have successfully done this, providing models and best practices. There are also existing resources and opportunities already in place that we can leverage both to bring the project to fruition and defray some of the cost.

Running new fiber optic overhead, along power and telephone lines, can run between \$20-35K/mile, while running it underground as new construction can go as high as \$70-400K/mile. However, pulling new cable through existing conduit can bring that cost back down in line with overhead cable (\$20-50K/mile). Fortunately, Providence has several options worth exploring to avoid a major expenditure of this sort. First and foremost, Rhode Island as a whole already has significant fiber optic coverage, with service available to 97.8% of



the state through nine different providers. It is possible, though not assured, that this entire project can be achieved without laying any new cable. The capacity is already there; it's just not being leveraged.

Furthermore, last year the Ocean State Higher Education Economic Development and Administrative Network (OSHEAN), a coalition of universities, libraries, K-12s, hospitals, government agencies, and other nonprofits, completed construction of Beacon 2.0, a 450-mile fiber optic infrastructure that connects over 100 Community Anchor Institutions. Several of these CAIs are in Providence, including Brown, RISD, Rhode Island Hospital, the Rhode Island Department of Health, and the Rhode Island Emergency Management Agency. This network was financed through \$21.7 million in federal grants and \$10.7 million in private investment.

If new fiber optic infrastructure must be installed, Providence has two opportunities to do so at lower construction cost and with less disruption. First, the redevelopment of I-195 land provides a once-in-a-lifetime opportunity to design for the future from the ground up. Second, the Providence Water Supply Board is in the process of replacing 530 miles of water mains throughout the city, which may allow us to piggyback on existing roadwork.

Providence can also encourage the private sector to take the lead by decreasing the cost and difficulty of infrastructure upgrades. This is one area where we can work with the existing ISPs to encourage them to provide more and better service. They must negotiate for access to publicly owned rights of way in order to run fiber optic cable. They also require “pole attachment” contracts with public utilities to place their wires on utility poles or in underground ducts and conduits. Typically, municipal governments have made this expensive (sometimes doubling the cost of construction), and made navigating the necessary processes and permitting difficult and slow. We can follow the lead of cities like Kansas City by partnering with ISPs to lower costs, cut through red tape, and streamline and speed up permitting processes for network construction. By doing so, Kansas City gained a broadband network it never could have afforded on its own. Broadband RI, a state agency, is working on an inventory of all pole rights and rights of way throughout the state, providing the information we need to do this.

Several cities of comparable or smaller size to Providence, including Chattanooga; Lafayette, LA; and Bristol, VA have created citywide fiber optic networks. In all three of those cases, a public utility did the heavy lifting of building out the network. Chattanooga is similar to Providence in population (approximately 170,000 to our 178,000). Their network cost about \$300 million to build, but they were covering a much larger geographic area (approximately 143 square miles to our 20.5). Most of that money has been made back through sales of broadband service and wider economic development that resulted from the network.



Kansas City and Austin, TX partnered with Google Fiber to launch theirs, which involves providing the tech giant with a detailed study of existing infrastructure and factors that affect construction, and streamlining permitting processes. Google Fiber is already in talks with nine other cities about establishing networks, but is not considering the addition of any others yet. Similarly, Provo, UT built its own network at a cost of \$39 million, but then sold it to Google Fiber for \$1; the idea being that Google could operate the network more effectively and provide more affordable service to more people. For comparison, Provo’s

population is considerably smaller than Providence's (about 115,000), but its network had to cover more than twice the land area (44 square miles).

### **The Plan**

Perhaps the best model for Providence is currently underway in North Carolina. A consortium of universities and municipalities, including Duke, NC State, UNC Chapel Hill, Raleigh, Durham, and Winston-Salem, issued a request for proposals (RFP) for a project called the North Carolina Next Generation Network – basically asking a developer or private company to build them an ultra high speed fiber optic network. As of June 20, AT&T had finalized an agreement to take on the project.

As all the other cities that have successfully done this have demonstrated, no municipal government can afford this on its own; innovative public-private partnerships are the way of the future for large city projects. As Mayor, I will



bring together all the necessary stakeholders – including government agencies, private businesses, nonprofits, schools, hospitals, developers, and more – to form a working group under the direction of the City's Chief Innovation Officer, a cabinet-level position I intend to create. This group will be responsible for issuing RFPs, seeking out funding, establishing partnerships, and learning best practices from similar projects, then devising a plan for implementation. Broadband RI is already prepared to provide a lot of the data we will need, and the General Assembly recently passed legislation to create a statewide Broadband Advisory Commission.

By leveraging existing infrastructure and opportunities; building strategic public-private partnerships; decreasing the cost and difficulty of network construction; and seeking out federal and private funding, Providence will find the right combination for the Digital Rivers Project. As Mayor, I will lead the effort to find a citywide broadband solution for Providence, and create the economy of the future. The time is now to build in the crucial innovation infrastructure and stay ahead of the technological curve.

### **Conclusion**

This project is essential. What seems right now like a bold innovation is quickly becoming the basic standard for any city hoping to take its place in the global economy. The benefits are immediate, as well as long term. Because of fiber optic's exponential capacity to handle bandwidth, today's investment in this technology will not be rendered obsolete when internet speeds get even faster. We will see the immediate return on investment that happens when vital institutions like schools, hospitals, libraries and government centers are connected to a citywide network, but we will continue to see further innovations



for years to come as the collective energy of the private sector is amplified by this technology. As nonprofits, institutions of higher education, businesses, factories, and many more entities begin to explore the potential of this network, they will identify new uses and innovations, and find new connection points we never thought possible. Just as the businesses of the great Industrial Era located in Providence because it was near the rivers they needed to power their factories, so too will the businesses of the next great economic boom locate near the kind of fast, powerful information networks they need to power their work. The Providence Digital Rivers Project will provide that power source for decades to come.



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## **The Providence Digital Rivers Project Explained**

### **What are you proposing?**

The development of a citywide gigabit speed broadband network.

### **Which is what, exactly?**

A network of fiber optic cables capable of delivering internet speeds up to 100 times faster than the current average to every business, school, residence, office, library, etc. in the entire city.

### **Why does that matter?**

Right now it would be a bold innovation for a small city trying to jumpstart its economy – but it's quickly becoming the basic standard for any city hoping to take its place in the global innovation economy. This is the modern day equivalent of wiring an entire city onto the electrical grid for the first time – it's building for the present and the future.

### **Is this one of those free internet for the whole city deals?**

No. Municipal wi-fi (blanketing an entire city with free wi-fi internet) was a popular idea in the last decade, but it proved impractical and difficult to execute. More importantly, in an era in which an estimated 98% of Americans have access to at least basic broadband and 56% of adults own smartphones, it was kind of redundant.

### **What's in it for me?**

Your cable company is most likely charging you high prices for slower internet than they're capable of delivering. This would offer much faster speeds for about the price you're already paying. Competition like that means the cable companies will have to try harder to keep your business. For example, Kansas City recently got citywide fiber optic courtesy of the Google Fiber project. The service launched in November 2013, and by December, Time Warner Cable began boosting the speed of its own service in that market. Later, when Google Fiber expanded into Austin, TX, AT&T quickly announced plans to offer its own gigabit service, and Time Warner offered to include free wi-fi in public areas to existing customers.

### **How fast is gigabit speed?**

Approximately 100 times faster than most current internet speeds. For reference, gigabit speed allows you to download an entire HD feature-length movie in approximately 30 seconds to a minute.

### **This whole thing is just about faster internet for consumers?**

Hardly. In fact, that's just one of the fringe benefits. The main reason for doing this is to provide the infrastructure for the knowledge- and innovation-based economy we're trying to develop in Providence.

Think of this way: the businesses of the great Industrial Era located in Providence because it was near the rivers they needed to power their factories. The businesses of the next great economic boom will locate near the kind of fast, powerful information networks they need to power their work.

### **Does that really make a difference?**

Ask the former Mayor of Chattanooga, TN. Chattanooga developed a municipal fiber optic network that led to it being dubbed “Gig City.” It has made the city one of the Southern hubs of the Knowledge Economy. Both Volkswagen and Amazon.com located new facilities in Chattanooga after this. The capabilities also enable innovation in the private sector and large institutions, as they are able to develop apps that can only function with ultra high speed internet. For example, a group of Chattanooga radiologists developed its own app to allow doctors to view digitized scans anywhere, anytime. And the city is only just beginning to discover the possibilities. “Our fiber network is like having the first city that discovered fire,” said Mayor Ron Littlefield.

### **How do we make this happen?**

There are a lot of different models for doing this, and the first step is to explore which one is right for Providence. Fortunately, there are several examples of comparably sized cities successfully developing their own fiber optic networks, including Chattanooga; Lafayette, LA; and Bristol, VA. In those three, a public utility actually built the network. Kansas City and Austin, TX partnered with Google Fiber to launch theirs. Google Fiber is already in talks with nine other cities about establishing networks, but is not considering any more yet.

Perhaps the best model for Providence, however, is currently underway in North Carolina. A consortium of universities and municipalities, including Duke, NC State, UNC Chapel Hill, Raleigh, Durham, and Winston-Salem, issued a request for proposals for a project called the North Carolina Next Generation Network – basically asking a developer or private company to build this network for them. As of June 20, AT&T had finalized an agreement to take on the project.

### **What’s this going to cost?**

It can be expensive, but there are a number of options for both lowering the cost, and getting some of it paid for. For example, the North Carolina proposal called for a private developer to build the network and cover most of the cost. Right here in Rhode Island, a coalition of universities, libraries, schools, hospitals, government agencies, and other nonprofits just completed construction of Beacon 2.0, a 450-mile fiber optic infrastructure that connects over 100 institutions, including Brown, RISD, Rhode Island Hospital, the Rhode Island Department of Health, and the Rhode Island Emergency Management Agency. This was financed through \$21.7 million in federal grants and \$10.7 million in private investment.

Running new fiber optic along power and telephone lines can run between \$20-35K/mile, while running it underground as new construction can go as high as \$70-400K/mile. However, pulling new cable through existing conduit can bring that cost back down in line with overhead cable (\$20-50K/mile). Fortunately, there are possibilities for keeping costs down. First and foremost, Rhode Island as a whole already has significant fiber optic coverage, with service available to 97.8% of the state through nine different providers. It is possible, though not assured, that this entire project can be achieved without laying any new cable. The capacity is already there; it's just not being used.

If we do need to install new cable, there are two opportunities to do so at lower construction cost and with less disruption. First, the redevelopment of I-195 land provides a once-in-a-lifetime opportunity to design for the future from the ground up. Second, the Providence Water Supply Board is in the process of replacing 530 miles of water mains throughout the city, which may allow us to piggyback on existing roadwork.

In short, this doesn't have to be as expensive as it sounds. But, as every city that's done this has demonstrated, no municipal government could ever afford to do this on its own. As Mayor, I will rally together all the necessary stakeholders and create a working group overseen by the City's Chief Innovation Officer (a cabinet-level position I intend to create). Then we'll request proposals, seek out funding, develop partnerships, and take all the steps necessary to get this thing built.

### **Once we build it, what do we do with it?**

Imagine doctors at Brown's Alpert Medical School able to teach classes all over the world through high quality video conferencing; Rhode Island Hospital able to perform remote diagnostics; RIEMA, first responders, and utilities able to coordinate sophisticated disaster relief efforts; the universities able to collaborate in high level research and learning through Internet2; K-12 schools able innovate their curriculum through cloud-based learning; libraries able to provide more internet-based services to more people; a startup community able to leverage broadband connectivity to grow and scale up more quickly; local businesses with greater capacity to connect to a complex global economy.

As the Mayor of Chattanooga said, it's like discovering fire. Once you've discovered it, what do you do with it? The possible answers are limited only by our imagination.

**Give me the bottom line: will all this let me stream Game of Thrones any faster?**

Yes.